Fake Test 3

1. a) Give the first four partial sums for $\sum_{j=0}^{\infty} \frac{1}{3^j}$

$S_0 =$

$S_1 =$

$S_2 =$

$S_3 =$

b) Guess the formula for $S_n =$

c) $\lim_{n\to\infty} S_n =$

2. a) What is the sum s of $x^2 + x^3 + x^4 + x^5 + \cdots$ when it converges

$s =$

b) Do the ratio test and find for what x it converges

3. a) $\binom{\frac{1}{3}}{1} =$ $\binom{\frac{1}{3}}{2} =$ $\binom{\frac{1}{3}}{3} =$ $\binom{\frac{1}{3}}{4} =$

b) $\sqrt[3]{1+x} = 1 +$ (cube root)

give 5 terms (Four more)

c) Approximate $\sqrt[3]{1.08}$ using your series up to the x^3 term

ans _____

d) How big could the error possibly be?

ans _____

4. Use the comparison test to check convergence of

a) $\sum_{n=0}^{\infty} \frac{1}{10 + n^2}$

b) $\sum_{n=11}^{\infty} \frac{1}{n - 10}$

c) $\sum_{n=2}^{\infty} \frac{1}{\sqrt{n} - 1}$

5. Use the limit comparison test to test the convergence

a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}+8}$

b) $\sum_{n=1}^{\infty} \frac{1}{n^3-n+13}$

6. Use the retro test to check the convergence of

a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n!}}$

b) $\sum_{n=1}^{\infty} \frac{n^2}{n!}$

7. A certain function satisfies $f(0)=1$, $f'(0)=0$, $f''(x)=f(x)$. Find its Taylor series. Identify the function if you can.

a) $f(0)=$ $f''(0)=$ $f^{(4)}(0)=$ $f^{(7)}(0)=$
$f'(0)=$ $f'''(0)=$ $f^{(5)}(0)=$ $f^{(8)}(0)=$

b) $f(x) =$ _____ Taylor series

c) The function is _____

8. Using $|R_n(x)| \leq \frac{M}{(n+1)!}(b-a)^{n+1}$ find the maximum error possible when using $\cos x \approx 1 - \frac{x^2}{2!}$ on the interval $[0, \frac{\pi}{4}]$.
(4 pts extra credit if you see the trick)

9. On the back of this sheet find the Taylor series of $e^{-x}\sin x$ by multiplying the series for e^{-x} by the series for $\sin x$. Find the first four non-zero terms. (You need to go up to x^5 since the x^4 term is 0.